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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/565,426

01/18/2006

David Richard Hallam

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05/14/2009

YOUNG & BASILE, P.C.

3001 WEST BIG BEAVER ROAD

SUITE 624

TROY, MI 48084

EXAMINER

RIPA, BRYAN D

ART UNIT

PAPER NUMBER

1795

NOTIFICATION DATE

DELIVERY MODE

05/14/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/565,426	Applicant(s) HALLAM, DAVID RICHARD	
	Examiner BRYAN D. RIPA	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/26/06</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Objections

1. Claims 8 and 13 are objected to because of the following informalities:

Regarding claim 8, claim 8 recites the limitation “at least one filter” despite the fact that claim 7 also includes “at least one filter.” It is somewhat ambiguous as to whether claim 8 is meant to further limit the previously mentioned filter of claim 7 or whether as presently written it merely requires the presence of a filter additional or otherwise for removing tobacco smoke, etc.

If it is applicant's intent to denote a second filter such should be indicated. Alternatively, if the limitation of claim 8 is meant to further limit the “at least one filter” of claim 7 then “the” or “said” should be inserted prior to its mention.

Regarding claim 13, the word “voltage” has been misspelled.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, claims 1 and 17 both recite a negative limitation requiring there to be no use of an ozone decomposition catalyst. In interpreting claim language the examiner is required to give the claim terms their broadest reasonable interpretation consistent with the specification. See MPEP §2111. In light of that standard, as presently written the phrase would apply to any substance within the apparatus which would act to catalyze, i.e. help to initiate or accelerate, the decomposition reaction of ozone to diatomic oxygen without itself reacting.

However, although the claim limitation requires there to be no use of an ozone decomposition catalyst, the specification discusses the use of titanium dioxide in the dielectric layer (see ¶122) and the use of other materials (see ¶122 and ¶133 disclosing the use of glass for the dielectric and aluminum for the casing) that are known to catalyze the decomposition of ozone (see Masuda et al., "The Performance of an Integrated Air Purifier for Control of Aerosol, Microbial, and Odor" IEEE Transactions on Industry Applications 29 (4), pages 774-780 (1993) teaching the use of titanium dioxide in a silica based ceramic material to catalyze the decomposition of ozone, Potember et al., WO 2003/028773 A1 page 17, listing the use of aluminum, metals, metal oxides as

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suitable materials to catalyze the decomposition of ozone and even glass and silica as having some catalytic effect on the decomposition of ozone).

Consequently, the claim language requiring the negative limitation is unclear in light of the fact that the claimed apparatus appears to require the use of materials that can potentially act to catalyze the decomposition of ozone.

3. Claims 7 and 10 recite the limitations "said at least one inlet" and "said at least one outlet" in the first line of those respective claims. There is insufficient antecedent basis for this limitation in the claim.

4. Claim 11 recites the limitation "respective ones of the inlet and outlet" in the last two lines of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2, 7–10 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Yikai et al., (U.S. Pat. No. 5,055,115) (hereinafter referred to as "YIKAI").

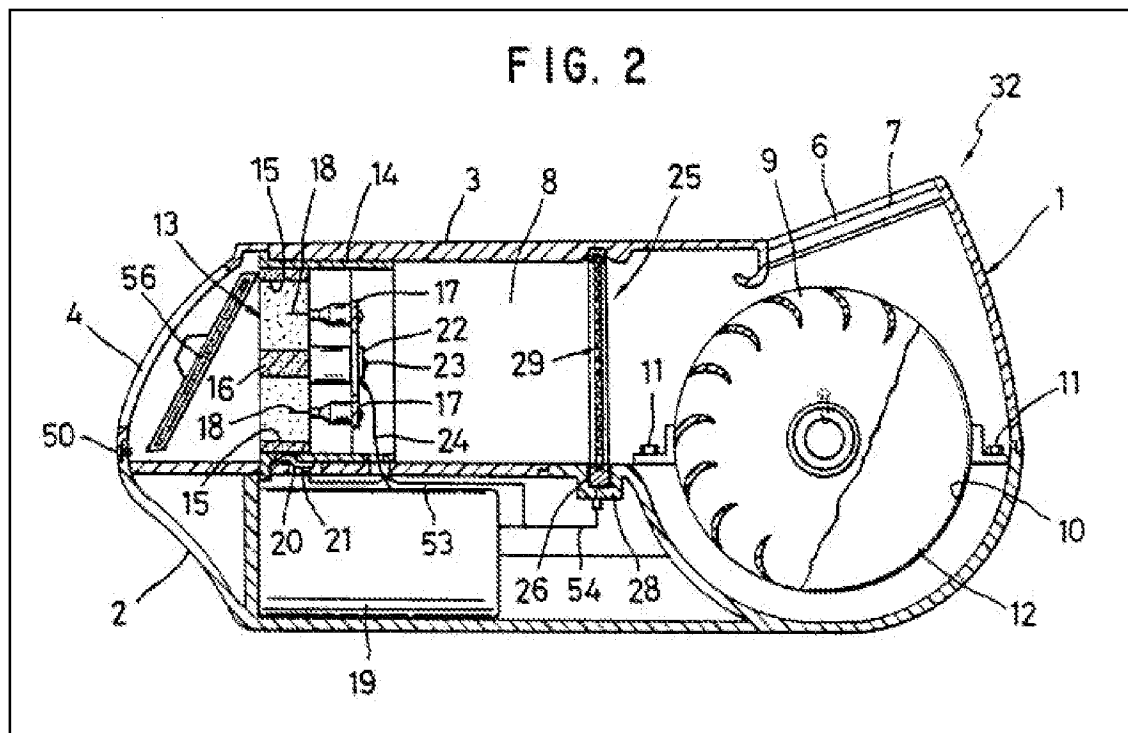
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Regarding claim 1, YIKAI teaches an apparatus for the treatment of air comprising a low power corona discharge ozone generator (see col. 1 lines 6-11 discussing the device being an air cleaner employing the use of a corona discharge which generates ozone which would aid in the purification and cleansing of the air moving through the device) mounted inside a chamber having an air inlet and an air outlet (see air inlet 4 and air outlet 6) and at least one air flow impeller formed and arranged for inducing a flow of air through said chamber (see fan 9; col. 3 lines 66-67 teaching the fans purpose to drive air through the device), said ozone generator being formed and arranged for generating a restricted concentration of ozone and any other reactive species formed together therewith, within an inactivating zone contained within said chamber, through which said air flow is passed in use of said apparatus (see col. 3 lines 1-9 discussing the use of a high voltage corona discharge, which would generate ozone, within the space occupied by electric precipitating device 13 up to carbon filter 29, i.e. an inactivating zone, through which the air flow is passed), which restricted concentration is sufficient effectively to inactivate airborne pollutant material entrained in said air flow (see col. 3 lines 1-9; col. 3 lines 27-30 teaching the generation of ozone by the high voltage corona discharge), yet which restricted concentration decays sufficiently outside said inactivating zone so that the concentration of ozone in the cleaned air expelled from said apparatus is at a physiologically acceptable level without the use of an ozone decomposition catalyzer (see carbon filter 29; col. 4 lines 15-24 teaching the use of a carbon filter outside the inactivating zone to reduce the ozone

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concentration by chemical reaction so as to emit air from the device free of ozone). See figure 2 below.

Please note, because the device produces some ozone, the concentration no matter how small could be said to be sufficient so as to effectively inactivate airborne pollutant material in the air flow since in the presence of ozone some airborne pollutant material would necessarily be inactivated.



Regarding claim 2, YIKAI teaches the apparatus for the treatment of air wherein said low power corona discharge ozone generator comprises a low power corona discharge device provided with a low power high voltage output transformer (see voltage impressing apparatus 19; col. 3 lines 5-8). See figure 2 above.

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Regarding claim 7, YIKAI teaches the apparatus for the treatment of air wherein the inlet is fitted with at least one filter (see filter 56; col. 3 lines 55-58). See figure 2 above.

Regarding claim 8, YIKAI teaches the apparatus for the treatment of air wherein is provided at least one filter for removing tobacco smoke (see col. 4 lines 7-14 teaching the collection of tobacco smoke on collecting electrode 16, i.e. electric precipitating apparatus 13 acting as a filter). See figure 2 above.

Regarding claim 9, YIKAI teaches the apparatus for the treatment of air wherein the outlet is fitted with at least one filter (see fins 7; col. 2 lines 46-48 stating air outlet 6 having a number of fins which would act as a filter). See figure 2 above.

Regarding claim 10, YIKAI teaches the apparatus for the treatment of air wherein is provided an electrostatic filter (see col. 2 lines 58-60 teaching there being an electrostatic precipitator in the device, i.e. an electrostatic filter).

Regarding claim 17, YIKAI teaches a method of cleaning air without the use of an ozone decomposition catalyzer (see discussion above with respect to claim 1 discussing the use of a carbon filter to chemically react with the ozone), comprising the steps of: providing an apparatus of claim 1 (see the discussion above with respect to claim 1), powering the ozone generator of said apparatus so as to generate ozone in

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the inactivation zone of said apparatus (see col. 3 lines 59-63; col. 3 lines 5-8 and col. 3 lines 27-30), and operating said airflow impeller so as to pass a flow of said air through said inactivation zone (see col. 3 lines 64-68). See figure 2 above.

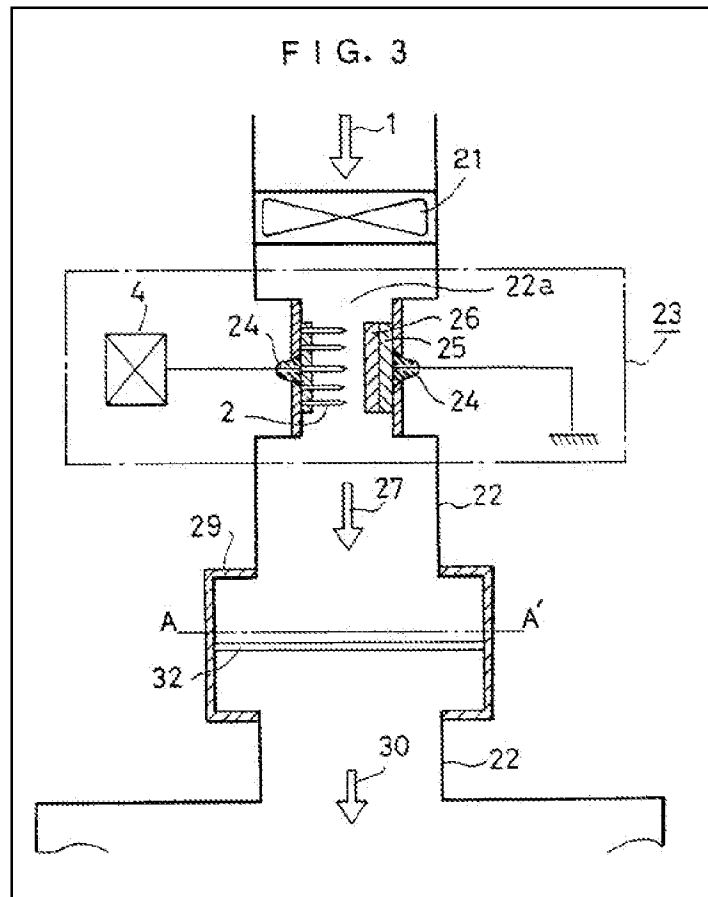
6. Claims 1, 2, 16 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Ikeda et al., (U.S. Pat. No. 5,445,798) (hereinafter referred to as "IKEDA").

Regarding claim 1, IKEDA teaches an apparatus for the treatment of air comprising a low power corona discharge ozone generator (see ionization chamber 23; col. 10 line 66-col. 11 line 9 describing the apparatus used for creating the corona discharge; col. 11 lines 15-17 teaching the formation of ozone) mounted inside a chamber having an air inlet and an air outlet (see air inlet and outlet at the top and bottom of figure 3) and at least one air flow impeller formed and arranged for inducing a flow of air through said chamber (see fan 21; col. 10 lines 32-34), said ozone generator being formed and arranged for generating a restricted concentration of ozone and any other reactive species formed together therewith, within an inactivating zone contained within said chamber, through which said air flow is passed in use of said apparatus (see col. 11 lines 10-17 discussing the use of a high voltage corona discharge to generate ozone, within the space occupied by ionization chamber 23 up to heating resistor 32, i.e. an inactivating zone, through which the air flow is passed), which restricted concentration is sufficient effectively to inactivate airborne pollutant material entrained in said air flow (see col. 11 lines 10-17 discussing the use of a high voltage corona

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discharge to generate ozone), yet which restricted concentration decays sufficiently outside said inactivating zone so that the concentration of ozone in the cleaned air expelled from said apparatus is at a physiologically acceptable level without the use of an ozone decomposition catalyzer (see col. 13 lines 54-59 discussing embodiment 3, as shown in figure 3, not requiring the presence of ozone decomposition catalysts but instead using heat to decompose the residual ozone). See figure 3 below.

Please note, because the device produces some ozone, the concentration no matter how small could be said to be sufficient so as to effectively inactivate airborne pollutant material in the air flow since in the presence of ozone some airborne pollutant material would necessarily be inactivated.



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Regarding claim 2, IKEDA teaches the apparatus for the treatment of air wherein said low power corona discharge ozone generator comprises a low power corona discharge device provided with a low power high voltage output transformer (see high voltage generator 4; col. 1 lines 19-22 and col. 11 lines 5-6 discussing the application of a several kV potential by the voltage generator). See figure 3 above.

Regarding claim 16, IKEDA teaches the apparatus for the treatment of air wherein the low power corona discharge device has a solid dielectric (see dielectric 26; col. 10 lines 39-42). See figure 3 above.

Regarding claim 17, IKEDA teaches a method of cleaning air without the use of an ozone decomposition catalyzer (see discussion above with respect to the rejection of claim 1 under IKEDA discussing the use of a pyrolytic means to decompose the ozone), comprising the steps of: providing an apparatus of claim 1 (see the discussion above with respect to the rejection of claim 1 under IKEDA), powering the ozone generator of said apparatus so as to generate ozone in the inactivation zone of said apparatus (see high voltage generator 4), and operating said airflow impeller so as to pass a flow of said air through said inactivation zone (see col. 10 line 63-col. 11 line 17). See figure 3 above.

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
7. Claims 3, 5, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over IKEDA as applied to claims 1 and 2 above, and further in view of Hallam et al., (GB 2358350) (hereinafter referred to as "HALLAM").

Regarding claim 3, IKEDA does not teach the low power corona discharge device comprising concentric tubular metal gauze electrodes separated by a tubular strengthened glass dielectric.

However, HALLAM does teach the use of a low power corona discharge device for the generation of ozone comprising concentric tubular metal gauze electrodes separated by a tubular strengthened glass dielectric (see page 3 discussing corona unit

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19 comprising a quartz glass sandwiched between two stainless steel mesh electrodes which would provide for some amount of strengthening to the glass dielectric).

Consequently, as shown by HALLAM, a person of ordinary skill in the art would accordingly have recognized the use of a tubular corona discharge device to facilitate creating an electric field for the generation of ozone and ions.

The simple substitution of one known element for another is likely to be obvious when predictable results are achieved. See *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1395–97 (2007) (see MPEP § 2143, B.).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the ionization chamber of IKEDA with the discharge unit of HALLAM to obtain the predictable result of having a low power corona discharge device having concentric tubular metal gauze electrodes separated by a tubular strengthened glass dielectric.

Regarding claim 5, HALLAM teaches the low power corona discharge ozone generator having a power rating of approximately 36 watts (see page 3 teaching the operating current being 9 mA at 4 kV).

Regarding claim 13, HALLAM teaches the low power corona discharge ozone generator wherein an AC supply is used with an operating voltage in the range from 1 to 6 kV (see page 3 teaching the potential between the electrodes being 4 kV).

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Regarding claim 14, HALLAM teaches the low power corona discharge ozone generator wherein an AC supply providing a starting current in the range from 1 to 10 mA (see page 3 teaching the operating current being 9 mA).

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over IKEDA as applied to claims 1 and 2 above, as well as, IKEDA in view of HALLAM as applied to claim 3 above, and further in view of the English abstract of JP 51103095 (hereinafter referred to as "NIPPON") with evidence from Fovell et al., (U.S. Pat. No. 4,960,569) (hereinafter referred to as "FOVELL").

Regarding claim 4, IKEDA as modified by HALLAM does not teach the glass dielectric being of titanium oxide strengthened borosilicate glass. Rather, HALLAM teaches the dielectric being quartz glass (see page 3) and IKEDA, while mentioning the dielectric being glass, ceramic, or quartz does not explicitly teach the use of titanium dioxide strengthened borosilicate glass.

However, NIPPON teaches the use of a glass dielectric having titanium dioxide added in an ozone generator (see abstract).

Furthermore, FOVELL evidences the fact that the use of borosilicate glass in a concentric tubular corona discharge device for the creation of ozone was known in the art (see col. 2 lines 58-60). As a result, one of ordinary skill in the art would have understood the term glass to include all types of glass, i.e. including borosilicate glass.

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Consequently, as shown by NIPPON and as evidenced by FOVELL, a person of ordinary skill in the art would accordingly have recognized the use of a titanium dioxide strengthened borosilicate glass as the dielectric for use in a corona discharge device.

The simple substitution of one known element for another is likely to be obvious when predictable results are achieved. See *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1395–97 (2007) (see MPEP § 2143, B.).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to provide for the use of a borosilicate glass dielectric with titanium dioxide as claimed.

9. Claims 6 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over YIKAI and IKEDA as applied to claim 1 above.

Regarding claims 6 and 15, YIKAI and IKEDA are silent with respect to the residence time and flow rate of the air to be treated.

However, one of ordinary skill in the art would have recognized the flow rate of air through the apparatus and the residence time of the air to be treated in the chamber to be a result effective variable, since the flow rate and residence time of the air to be treated would need to be adjusted so as to allow for sufficient time for the air to be cleaned as disclosed. See MPEP §2144.05 IIB.

As a result, one of ordinary skill in the art would have been motivated to provide for a flow rate of air through the apparatus in the range of 50 to 2500 m³/hr as well as

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others and a residence time of 0.2 to 20 seconds in the chamber of the apparatus in order to find optimum working conditions that maximize the flow rate of air, thereby decreasing the residence time, while still allowing sufficient time for air purification.

10. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over YIKAI as applied to claims 1 and 7 above, and further in view of Tepper et al., (U.S. Pat. No. 5,290,330) (hereinafter referred to as "TEPPER").

Regarding claim 11, while YIKAI does teach the inlet and the outlet being disposed in proximity to each other, YIKAI does not teach there being a single filter mounting.

However, TEPPER teaches an air filtration system where the inlet and the outlet are in proximity to each other and where the apparatus is also provided with a single filter mounting (see housing 102; col. 4 lines 37-58 teaching various configurations of the air inlet and outlet to suit the particular application).

Consequently, as shown by TEPPER, a person of ordinary skill in the art would accordingly have recognized the use of a single filter mounting with the air cleaning device of YIKAI.

The simple substitution of one known element for another is likely to be obvious when predictable results are achieved. See *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1395–97 (2007) (see MPEP § 2143, B.).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to alter the shape of the YIKAI air cleaner to comprise a more box-like unit, as that used in TEPPER, to provide for the predictable result of having a single filter mounting with a filter occluding both the inlet and outlet of the device.

Please note, in interpreting claim 11 the examiner is only requiring the presence of a single filter mounting, since “the filter” referred to in claim 11 is the “at least one filter” of claim 7 which is not limited to require a single filter by the claim language. As such, the housing 102 having baffles covering the air inlet and air outlet on front wall 130, which occlude both the inlet and the outlet, would read on the claim.

11. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over IKEDA as applied to claim 1, and further in view of FOVELL.

Regarding claim 12, IKEDA does not explicitly teach the AC supply having a frequency in the range from 50 to 1000 Hz.

However, FOVELL teaches the use of a corona discharge ozone generator where the AC supply has a frequency of 400 Hz (see col. 5 lines 10-11).

Consequently, as shown by FOVELL, one of ordinary skill in the art would accordingly have recognized the use of an AC supply having a frequency around 400 Hz as a suitable frequency.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have the AC supply having a frequency in the range of 50 to 1000

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Hz as claimed in order to provide for the generation of a corona discharge in the device of IKEDA.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRYAN D. RIPA whose telephone number is 571-270-7875. The examiner can normally be reached on Monday to Friday, 9:00 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/B. D. R./
Examiner, Art Unit 1795

/Brian J. Sines/
Supervisory Patent Examiner, Art Unit 1795